

LAND USE LAND COVER CHANGES, SOIL EROSION AND LAND DEGRADATION NEUTRALITY IN THE COCONUT TRIANGLE OF SRI LANKA

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In recent decades, land fragmentation has been a common problem in the coconut triangle of Sri Lanka, which has led to changes in land use land cover (LULC) and reduced coconut production. LULC changes may cause soil erosion and land degradation. This study quantified changes in LULC, soil erosion and land degradation neutrality (LDN) in the coconut triangle. To identify changes in LULC, a train random trees classification method was used to map five distinct LULC classes using Landsat images of 1997 and 2022. Soil erosion was estimated from the revised universal soil loss equation (RUSLE) using ArcMap software. Three indicators: land cover, land productivity, and changes in soil organic carbon were used to measure LDN status. The Trends.Earth plugin for the QGIS platform was used to describe the dynamics of LDN during 2001–2020. The LULC analysis showed that paddy (5.27%), and forest (4.72%) areas have decreased while water bodies (0.85%), urban areas (4.49%), and coconut & other cultivation (4.66%) areas have increased from 1997 to 2022 in the coconut triangle. The estimated annual soil loss varied from 0 to 4849.48 t ha⁻¹ yr⁻¹ and the mean annual soil loss was 3.62 t ha⁻¹ yr⁻¹. The study area was classified into five soil erosion hazard classes: very low 76% (0–5 t ha⁻¹ yr⁻¹), low 9% (5–10 t ha⁻¹ yr⁻¹), moderate 8% (10–20 t ha⁻¹ yr⁻¹), high 5% (20–50 t ha⁻¹ yr⁻¹), and very high 2% (>50 t ha⁻¹ yr⁻¹) areas. Results of LDN indicated, 13.56% of degraded, 50.27% stable, and 34.18% of improved lands exist in the coconut triangle. This study revealed soil erosion and LDN changes in several coconut lands. Hence, implementing soil conservation activities in the coconut triangle is suggested to achieve higher coconut production.

Keywords: Remote sensing, RUSLE, Trends.Earth, Land fragmentation, Soil organic carbon